

Juvenile Fish Survey Data Summary to Autumn 2024

<u>Purpose</u>

Estuaries and sheltered coastal habitats provide a range of ecosystem services and are known for their high productivity and biodiversity. They offer suitable habitats for juvenile fish as nursery areas as well as species throughout their lifecycle for feeding, spawning and refuge. As part of the Southern IFCA Inshore Netting Review, Southern IFCA determined to enhance the environmental, socio-economic and sustainability of fisheries within the District by supporting the use of harbours and estuaries by fish populations for these purposes, collectively referring to the areas as Essential Fish Habitats (EFH).

As part of the Southern IFCA's Fish Monitoring Programme, surveys are carried out at a range of sites across the District in order to understand the use of these EFH by commercial and recreational fish species. Building a time-series dataset will allow any changes in fish communities to be observed to help understanding of EFH, contributing to a database that can be used for reviewing fisheries management.

<u>Method</u>

- 1. Southern IFCA Carry out Juvenile Fish Surveys in Spring and Autumn each year.
- 2. A 43 meter seine net is used to sample fish, deployed either by hand or using a vessel depending on location.
- 3. The net is set in a semi-circle from the shore and is recovered to the shore with any fish retained placed in aerated buckets.
- 4. The length of the first 50 fish of each species are measured (head-to-tail length) and carefully returned to the sea as quickly as possible.
- 5. Any remaining fish of each species are counted and returned to the sea.
- 6. The net is shot and hauled twice at each survey site.



Southern IFCA's juvenile fish surveys would not be possible without the help, permissions, resources and knowledge of multiple organisations. Thank you to the representatives of the following organisations for their help with the 2024 surveys.



Mudeford Spit



- Figures 1A, 1B and 1C display the Species Richness, Shannon Diversity Index (H) and total abundance in each survey carried out between Spring 2017 and Autumn 2024. Where no data is shown, there was no surveys conducted at that site.
- **Species richness** was highest in Autumn 2021 (9) and Spring 2021 (8), and lowest in Spring 2022 (2.5) and Autumn 2022 and 2023 (4). No survey has a significantly different species richness to another (p > 0.05).
- Spring 2024 displayed a lower **Shannon Diversity Index (H)** than Autumn 2024 due to the high dominance of Herring (58%, Figures 2A & 2B). No survey has a significantly different H to another (p > 0.05).
- Of the Spring surveys, 2021 had the highest **total abundance** of fish (173) and 2022 the lowest (11). Of the Autumn surveys, 2021 had the highest total abundance of fish
- surveys, 2021 had the highest total abundance of fish (1575) and 2023 the lowest (110). No survey has a significantly different total abundance to another (p > 0.05).
- There is no statistical difference between the species richness, Shannon Diversity Index or total abundance between Spring and Autumn (table to the right).

	All Spring surveys	All Autumn surveys	P<0.05
Mean Species Richness	2.94	3.44	No
Mean Shannon Diversi- ty Index (H)	0.64	0.53	No
Mean Total Abundance	35	280	No



• Figures 2A (Spring) and 2B (Autumn) display the percentage relative abundance of each species during each survey.

 In Spring 2024 Herring were the most abundant species (58%) followed by Flounder (23%). Whereas in Autumn 2024 Golden Grey Mullet were the most abundant species (38%) followed by Bass (25%) and Goby sp. (25%).



Figures 3A and 3B display the measured length (mm) of Bass and all Mullet species. Only Bass and Mullet are displayed due to their commercial importance within the Southern IFCA district.

All Grey Mullet sp. have been combined for Figure 3B due to difficulties in identifying the species as juveniles, however 3B displays distinct groups of sizes, likely related to the presence of the different species.



- Figures 4A, 4B and 4C display the Species Richness, Shannon Diversity Index (H) and total abundance in each survey carried out between Spring 2017 and Autumn 2024. Where no data is shown, there was no surveys conducted at that site.
- Species richness was highest in Autumn 2021 (7) and Spring 2021 (7.5), and lowest in Autumn 2023 (1.5) and Autumn 2024 (4.5). No survey has a significantly different species richness to another (p > 0.05).
- Spring 2024 (1.26) displayed a higher **Shannon Diversity Index (H)** than Autumn 2024 (0.71) due to the high dominance of Bass (62%, Figures 5A & 5B). No survey has a significantly different H to another (p > 0.05).
- Of the Spring surveys, 2021 had the highest mean total abundance of fish (476) and 2023 the lowest (46). Of the Autumn surveys, 2021 had the highest total abundance of fish (687) with 2023 the lowest (46). No survey has a significantly different total abundance to another (p > 0.05).
- There is no statistical difference between the species richness, Shannon Diversity Index or total abundance between Spring and Autumn (table to the right).

	All Spring surveys	All Autumn surveys	P<0.05
Mean Species Richness	3.94	3.06	No
Mean Shannon Diversity Index (H)	0.74	0.54	No
Mean Total Abundance	160	212	No



• Figures 5A (Spring) and 5B (Autumn) display the percentage relative abundance of each species during each survey.

In Spring 2024 Goby sp. were the most abundant species (45%) followed by Flounder (26%). Whereas in Autumn 2024, Bass were the most abundant species (62%) followed by Grey Mullet sp. (34%).



- Figure 6A and 6B display the measured length (mm) of Bass and all Mullet species. Only Bass and Mullet are displayed due to their commercial importance within the Southern IFCA district.
- All Grey Mullet sp. have been combined for Figure 6B due to difficulties in identifying the species as juveniles, however 6B displays distinct groups of sizes, likely related to the presence of the different species.



- Figures 7A, 7B and 7C display the Species Richness, Shannon Diversity Index (H) and total abundance in each survey carried out between Spring 2017 and Autumn 2024. Where no data is shown, there was no surveys conducted at that site.
- **Species richness** was equal highest in Autumn 2018, 2022, 2023 and Spring 2024 (6), and lowest in Autumn 2024 (3.5) and Spring 2022 (3). No survey has a significantly different species richness to another (p > 0.05).
- Spring 2024 (1.08) had a higher mean Shannon Diversity Index (H) than the Autumn 2024 survey (0.57) due to the high dominance of Sand Smelt in the Autumn survey (86%, Figures 8A & 8B). No survey has a significantly different H to another (p > 0.05).
- Of the Spring surveys, 2017 had the highest **total abundance** of fish (98) and 2023 the lowest (11). Of the Autumn surveys, 2018 had the highest total abundance of

surveys, 2018 had the highest total abundance of fish (980) and 2024 the lowest (37). No survey has a significantly different total abundance to another (p > 0.05).

 There is no statistical difference between the species richness, Shannon Diversity Index or total abundance between Spring and Autumn (table to the right).

	All Spring surveys	All Autumn surveys	P<0.05
Mean Species Richness	2.88	3.81	No
Mean Shannon Diversity Index (H)	0.61	0.58	No
Mean Total Abundance	29	180	No



• Figures 8A (Spring) and 8B (Autumn) display the percentage relative abundance of each species during each survey.

• In Spring 2024 Pollack were the most abundant species (62%) followed by Sand Smelt (11%). Whereas in Autumn 2024, Sand Smelt were the most abundant species (86%) followed by Goby sp. (9%).



- Figures 9A and 9B display the measured length (mm) of Bass and all Mullet species. Only Bass and Mullet are displayed due to their commercial importance within the Southern IFCA district.
- All Grey Mullet sp. have been combined for Figure 9B due to difficulties in identifying the species as juveniles.

Langton Hive



- Figures 10A, 10B and 10C display the Species Richness, Shannon Diversity Index (H), and total abundance in each survey carried out between Spring 2017 and Autumn 2024. Where no data is shown, there was no surveys conducted at that site.
- Species richness was highest in Autumn 2017 (9) and lowest in Autumn 2018 (4). Of the Spring surveys, species richness was highest in 2023 (8) and lowest in 2017 (4.5). No survey has a significantly different species richness to another (p > 0.05).
- Spring 2024 (0.52) had a lower mean **Shannon Diversity Index (H)** than the Autumn 2024 survey (1.17) due to the dominance of Goby sp. (87%, Figures 11A & 11B). No survey has a significantly different H to another (p > 0.05).
- Of the Spring surveys, 2017 had the highest mean total abundance of fish (311) and 2023 the lowest (44). Of the Autumn surveys, 2017 had the highest total abundance of fish (178) and 2018 the lowest (59). There is no significant difference (p > 0.0.5) in total abundance between any surveys.
- There is no statistical difference between the species richness, Shannon Diversity Index or total abundance between Spring and Autumn (table to the right).

	All Spring surveys	All Autumn surveys	P<0.05
Mean Species Richness	4.13	4.19	No
Mean Shannon Diversity Index (H)	0.70	0.71	No
Mean Total Abundance	94	78	No



- Figures 11A (Spring) and 11B (Autumn) display the percentage relative abundance of each species during each survey.
- In Spring 2024 Goby sp. were the most abundant species (87%) followed by Grey Mullet sp. (7%). Whereas in Autumn 2024, Grey Mullet sp. were the most abundant species (27%) followed by Sand Goby (19%).



- Figure 12A and 12B display the measured length of Bass and all Mullet species; only Bass and Mullet are displayed due to their commercial importance within the Southern IFCA district.
- All Grey Mullet sp. have been combined for Figure 12B due to difficulties in identifying the species as juveniles.



- Figures 13A, 13B and 13C display the Species Richness, Shannon Diversity Index (H) and total abundance in each survey carried out between Autumn 2021 and Autumn 2024. Where no data is shown, there was no surveys conducted at that site.
- **Species richness** was highest in Autumn 2022 (3) and lowest in Autumn 2024 (2). Of the Spring surveys species richness was highest in 2022 and 2023 (2.5) and lowest in 2024 (2). No survey has a significantly different species richness to another (p > 0.05).
- Spring 2024 (0.10) had a lower mean Shannon Diversity Index (H) than the Autumn 2024 (0.28) survey due to the dominance of Bass in the Spring survey (96%, Figures 11A & 11B). No survey has a significantly different H to another (p > 0.05).
- Of the Spring surveys, 2024 had the highest mean total abundance of fish (81) and 2022 the lowest (32). Of the Autumn surveys, 2021 had the highest mean total abundance of fish (175) and 2024 the lowest (55). No survey has a significantly different total abundance to another (p > 0.05).
- There is no statistical difference between the species richness, Shannon Diversity Index or total abundance between Spring and Autumn (table to the right).

	All Spring surveys	All Autumn surveys	P<0.05
Mean Species Richness	2.33	2.63	No
Mean Shannon Diversity Index (H)	0.41	0.28	No
Mean Total Abundance	51	117	No



- Figures 14A (spring) and 14B (autumn) display the percentage relative abundance of each species during each survey.
- In Spring 2024 Bass were the most abundant species (96%), there was a similar dominance of the survey in Autumn (Bass 92%).



- Figure 15A and 15B display the measured length of Bass and all Mullet species; only Bass and Mullet are displayed due to their commercial importance within the Southern IFCA district.
- All Grey Mullet sp. have been combined for Figure 15B due to difficulties in identifying the species as juveniles.



- Figures 16A, 16B and 16C display the Species Richness, Shannon Diversity Index (H) and total abundance in each survey carried out between Autumn 2016 and Autumn 2024. Where no data is shown, there was no surveys conducted at that site.
- Species richness was highest in Autumn 2017 (6.5) and lowest in Autumn 2024 (3.5). Of the Spring surveys mean
 species richness was highest in 2019 (6.5) and lowest in 2023 (2). No survey has a significantly different species richness to another (p > 0.05).
- Spring 2017 (1.27) had the highest mean Shannon Diversity Index (H) and 2023 the lowest (0.11). Of the Autumn surveys, 2023 had the highest mean H (1.23) and 2022 the lowest (0.77). There was no significant difference between H of any of the surveys (p > 0.05).
- Of the Spring surveys, 2023 had the highest mean total abundance of fish (408) with 2017 and 2018 the lowest (22.5). Of the Autumn surveys, 2016 had the highest mean total abundance of fish (432) and 2024 the lowest (29). No survey has a significantly different total abundance to another (p > 0.05).
- There is no statistical difference between the species richness, Shannon Diversity Index or total abundance between spring and autumn (table to the right).

	All Spring surveys	All Autumn surveys	P<0.05
Mean Species Richness	2.89	3.16	No
Mean Shannon Diversity Index (H)	0.64	0.65	No
Mean Total Abundance	85	122	No



- Figures 17A (spring) and 17B (autumn) display the percentage relative abundance of each species during each survey.
- In Autumn 2024 Bass and Common Goby were the most abundant species (both at 37%). No survey in Spring 2024.



- Figure 18A and 18B display the measured length of Bass and all Mullet species.
- All Grey Mullet sp. have been combined for Figure 18B due to difficulties in identifying the species as juveniles. Figure 18B shows distinct groups of sizes for Mullet sp., which could be related to the presence of the different species.